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मानक

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IS 368 (1992): Electric Immersion Water Heaters [ETD 32: Electrical Appliances]



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IS 368: 1992  
REAFFIRMED  
2009

भारतीय मानक

पानी गरमाने के डबाऊ हीटर की विशिष्टि  
(चौथी पुनरीक्षण)

*Indian Standard*

SPECIFICATION FOR ELECTRIC  
IMMERSION WATER HEATERS

*(Fourth Revision)*

UDC 683.975.621.365

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BUREAU OF INDIAN STANDARDS  
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NEW DELHI 110002

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Price Group 1

AMENDMENT NO.1 NOVEMBER 1999  
TO  
IS 368: 1992 SPECIFICATION FOR ELECTRIC  
IMMIERSION WATER HEATERS

*( Fourth Revision )*

*( Page 2, clause 12.1, first sentence )* - Substitute the following for the existing:

'The tests specified in Table 1 shall constitute the type tests and shall be carried out on one sample of immersion water beater selected preferably at random front a regular production lot.'

*(Page 2, clause 12.1.1, first sentence)* -Substitute the word 'The sample' for 'Both samples'.

(ETD32 )

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Reprography Unit, BIS, New Delhi, India

## FOREWORD

This Indian Standard ( Fourth Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Electrical Appliances Sectional Committee had been approved by the Electrotechnical Division Council.

This standard covers the safety and performance requirements of electric immersion water heaters.

This standard was published in 1952 and was revised first in 1963, second time in 1977 and third in 1983. As per the decision of the Third meeting of Electrotechnical Division Council, a separate safety standard on electric immersion water heaters has been brought out. In the fourth revision of this composite standard instead of giving details of safety requirements, reference has been made to safety standard IS 302-2-201 ( 1992) 'Safety of household and similar electrical appliances: Part 2 Particular requirements, Section 201 Electric immersion water heater'. Even though this standard does not specifically specify any performance oriented test it is intended to cover some performance requirements in future on the basis of future development within the country as also at the International Electrotechnical Commission ( IEC) level.

The details of the safety requirements are covered in IS 302-2-201 (1992). 'Safety of household and similar electrical appliances : Part 2 Particular requirements, Section 201 Electric immersion water heater'.

While preparing this standard, assistance has been derived from the following:

IEC Publication 335-1 ( 1976 ) Safety for household and similar electrical appliances: Part 1 General requirements. International Electrotechnical Commission.

BS : 3456 : Part 3 : Section 3.21 : 1981 Safety of household and similar electrical appliances Part 3 Complete particular specifications Section 3.21 Portable immersion heaters. British Standards Institution.

The manufacture of immersion water heaters with 'protective insulation' and 'double insulation' have not yet started in this country and hence this standard does not cover requirements for such types of immersion heaters.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding of numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Indian Standard*

**SPECIFICATION FOR ELECTRIC  
IMMERSION WATER HEATERS**

*(Fourth Revision)*

**1 SCOPE**

**1.1** The standard covers the general safety and performance requirements for ac single phase or dc portable electric immersion water heaters with a flexible cord and connector intended for water heating purposes.

This standard does not cover electric immersion water heaters incorporating thermostat.

**2 REFERENCES**

**2.0** The following Indian Standards are necessary adjuncts to this standard:

<i>IS No.</i>	<i>Title</i>
IS 302-2-201 ( 1992 )	Safety of household and similar electrical appliances: Part 2 Particular requirements, Section 201 Electric immersion water heater
IS 302-1 ( 1979 )	Safety of household and similar electrical appliances : Part 1 General requirements

**3 TERMINOLOGY**

**3.1** Clause 2 of IS 302-2-201 ( 1992 ) shall apply.

**4 GENERAL REQUIREMENTS**

**4.1** Clause 3 of IS 302-2-201 ( 1992 ) shall apply.

**5 GENERAL NOTES ON TESTS**

**5.1** Clause 4 of IS 302-2-201 ( 1992 ) shall apply.

**6 RATING**

**6.1** Clause 5 of IS 302-2-201 ( 1992 )

**7 CLASSIFICATION**

**7.1** Clause 6 of IS 302-2-201 ( 1992 ) shall apply.

**8 MARKING**

**8.1** Clause 7 of IS 302-2-201 ( 1992 ) shall apply.

**9 SAFETY REQUIREMENT**

**9.1** The electric immersion water heaters shall comply with the requirements given in 8 to 31 of IS : 302-2-201 ( 1992 ) except for 9.

**10 ENDURANCE**

**10.1** Electric immersion water heater shall be so constructed that, in normal use, there will be no electrical or mechanical failure that might impair compliance with the safety requirements specified in 8. The insulation shall not be damaged and contacts and connections shall not work loose as a result of heating, vibration, etc.

**10.2** Immersion water heater shall be placed in a vessel of appropriate shape containing a quantity of water 2.0 to 2.5 litres per 100W rated input, the water being initially cold and the appliance being immersed to the maximum depth of immersion ( up to the maximum safe immersion level in the case of dip in type appliance). The water heater is connected to the supply such that the input is 1.15 times the maximum rated input which is maintained throughout the test, The water heater is operated for 96 hours. Suitable amount of cold water is added occasionally to make up for the loss of water.

**10.3** After the test of **10.2**, the water heater shall withstand the electric strength test given in **16.4** of IS 302-1 ( 1979 ).

**11 FINISH**

**11.1** The external finish used on metal components shall be of non-hazardous and also of heat and moisture resisting nature and shall not be adversely affected by variation in temperature occurring under normal operating conditions or after the endurance test.

**11.1.1** Compliance shall be checked by visual inspection after endurance test as given in **10**.

**11.2** Ferrous parts, the rusting of which might cause the appliance to fail to comply with this standard, shall be adequately protected against rusting.

Compliance is checked by the following test:

All grease is removed from the parts to be tested by immersion in carbon tetrachloride or trichloroethane for 10 minutes.

The parts are then immersed for 10 minutes in a 10 percent solution of ammonium chloride in water at a temperature between 15°C and 35°C

Without drying, but after shaking off any drops, the parts are placed for 10 minutes in a box containing air having not less than 90 percent RH and temperature between 15°C and 35°C

After the parts have been dried for 10 minutes in a heating cabinet at a temperature of 100 ± 5°C, their surfaces shall show no signs of rust,

Traces of rust on sharp edges and any yellowish film removable by rubbing are ignored.

For small helical springs and the like, and for parts exposed to abrasion, a layer of grease may provide sufficient protection against rusting. Such parts are only subjected to the test if there is doubt about the effectiveness of the grease film and the test is then made without previous removal of the grease.

## 12 TESTS

### 12.0 Categories of Tests

Tests are classified as type, acceptance and routine tests.

#### 12.1 Type Tests

The tests specified in Table I shall constitute the type tests and shall be carried out on two samples of immersion water heaters of the same type and rating selected preferably at random from a regular production lot. Before commencement of the tests, the immersion heaters shall be visually examined and inspected for obvious visual defects in respect of components, parts and their assembly, construction, mechanical hazards, markings, provision of suitable terminals for supply connections, earthing and the effectiveness of screws and connections. The external surface finish shall be even and free from finishing defects.

Table 1 Schedule of Type Tests

( Clause 12.1 )

Sl No.	Test	Clause Reference
1.	Safety requirements	8, 10 to 31 of IS 302-2-201 ( 1992 )
2.	Endurance	10
3.	Finish	11

#### 12.1.1 Criteria of Acceptance

Both samples shall successfully pass all the type tests for proving conformity with the requirements of the standard. If any of the samples fails in any of the type tests, the testing authority, at its discretion, may call for fresh samples not exceeding twice the original number and subject them again to all tests or to the test(s) in which failure(s) had occurred. No failure should be permitted in the repeat test(s).

### 12.2 Acceptance Tests

The following shall constitute the acceptance tests:

Test	Clause Reference
a) Protection against electric shock	8 of IS 302-2-201 ( 1992 )
b) Input	10 of IS 302-2-201 ( 1992 )
c) Temperature-rise	11 of IS 302-2-201 ( 1992 )
d) Insulation resistance and electric strength at operating temperature	13 of IS 302-2-201 ( 1992 )
e) Moisture resistance	15 of IS 302-2-201 ( 1992 )
f) Insulation resistance and electric strength (after humidity treatment)	16 of IS 302-2-201 ( 1992 )
g) Earthing connection	27 of IS 302-2-201 ( 1992 )

**10.2.1** A recommended sampling procedure for acceptance tests is given in Appendix B of IS 302-1 ( 1979 ).

### 10.3 Routing Tests

The following shall constitute the routine tests:

Test	Clause Reference
a) Protection against electric shock	8 of IS 302-2-201 ( 1992 )
b) High voltage	13.2.2 of IS 302-1 ( 1979 )
c) Earthing connection	27 of IS 302-2-201 ( 1992 )



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